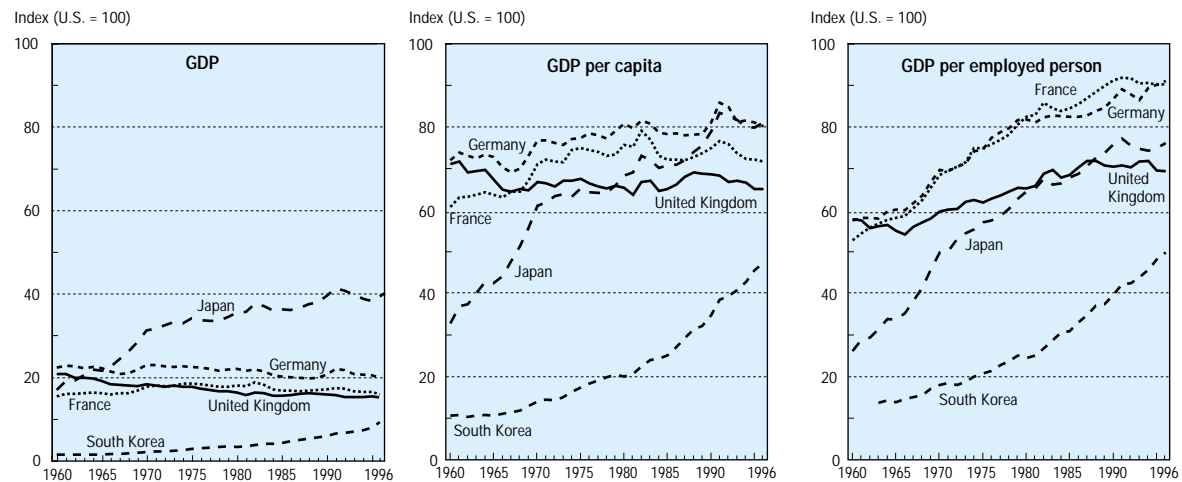


## International S&T Trends





**Figure 29. International economic comparisons**



**NOTES:** Country gross domestic products were determined with 1993 purchasing power parities using the Elteto-Koves-Szulc (EKS) aggregation method, which is the method used by the Organisation for Economic Co-operation and Development (OECD) and EUROSTAT in their official statistics. German data are for the former West Germany only.

**SOURCE:** U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology, *Comparative Real Gross Domestic Product Per Capita and Per Employed Person, Fourteen Countries, 1960–1996* (Washington, DC: February 1998).

**Figure 30. National expenditures on R&D, for selected countries**

(Billions of constant 1992 dollars)<sup>a</sup>

Year	United States	Japan <sup>b</sup>	Germany <sup>c</sup>	France	United Kingdom
1981	109.5	NA	23.4	16.6	17.3
1982	115.2	36.9	24.2	17.7	17.1
1983	123.1	40.0	24.7	18.3	16.9
1984	134.8	43.5	25.5	19.5	17.6
1985	146.1	48.3	28.3	20.3	18.4
1986	149.3	49.0	29.1	20.6	19.3
1987	152.0	52.5	31.3	21.5	19.7
1988	155.5	56.6	32.4	22.5	20.3
1989	158.2	62.0	33.7	23.9	20.9
1990	162.4	67.3	34.1	25.4	21.3
1991	165.3	68.8	36.6	25.7	19.6
1992	165.2	69.2	36.8	26.4	20.6
1993	161.2	67.4	35.5	25.8	20.7
1994	160.7	66.4	35.5	25.2	20.7
1995	170.4	73.6	36.6	25.7	20.1
1996	179.4	77.9	36.4	25.4	20.4
1997	189.4	80.9	37.6	25.0	20.3
1998	201.6	NA	38.6	NA	NA

NA = not available.

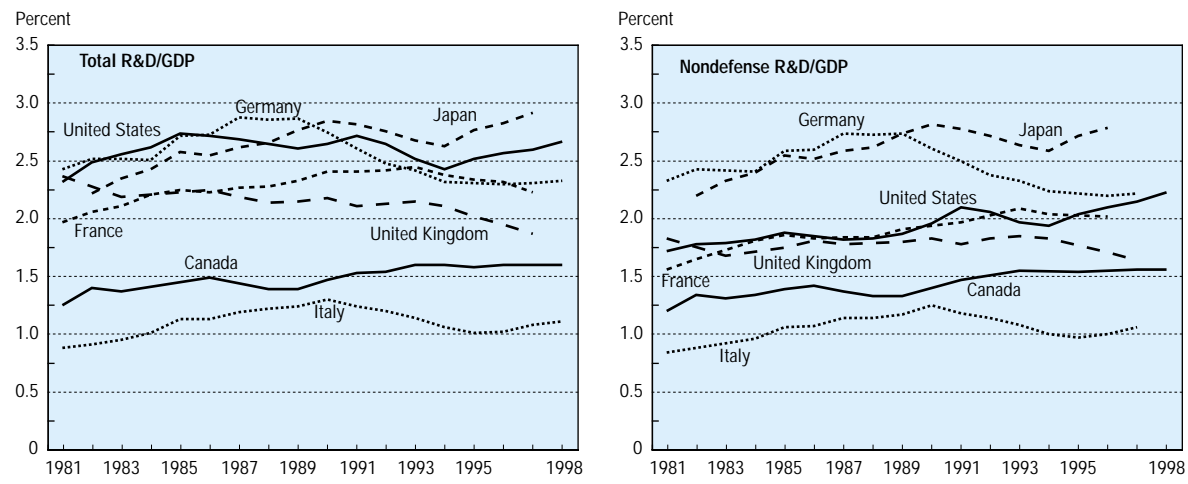
<sup>a</sup>Conversions of foreign currencies to U.S. dollars are calculated with purchasing power parity exchange rates.

<sup>b</sup>Break in Japanese data series in 1996 and later years.

<sup>c</sup>German data before 1991 are for West Germany.

**SOURCES:** National Science Foundation, Division of Science Resources Studies, *National Patterns of R&D Resources: 1998*, NSF 99-335 (Arlington, VA, 1999); and Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (Paris, 1999).

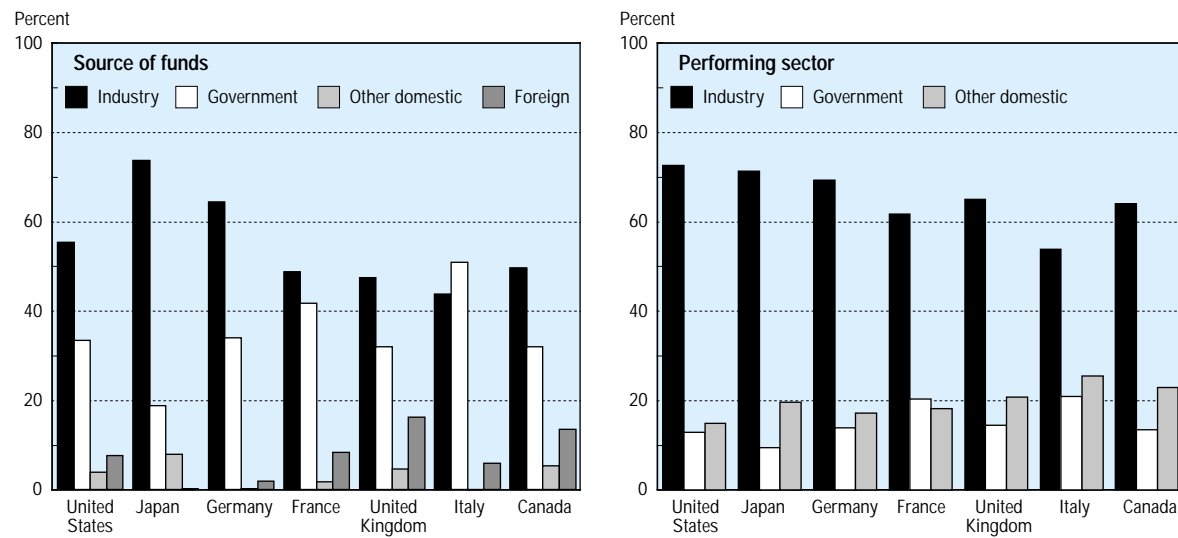
**Figure 31. R&D as a percentage of GDP, for G-7 countries**



GDP = gross domestic product

**SOURCES:** National Science Foundation, Division of Science Resources Studies, *National Patterns of R&D Resources: 1998*, NSF 99-335 (Arlington, VA, 1999); and Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (Paris, 1999).

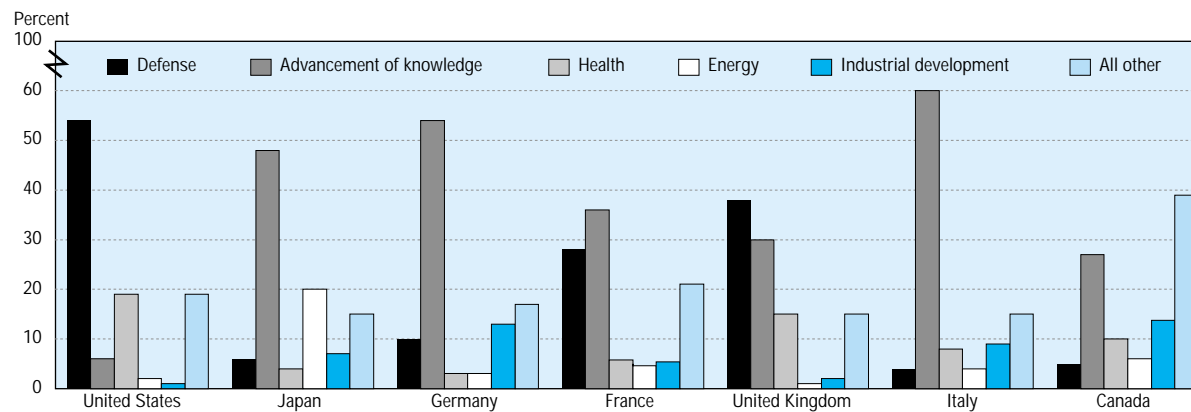
**Figure 32. R&D expenditures by country, source, and performer: 1996–98**



**NOTE:** Foreign sources of funds are majority-owned affiliates of foreign firms. Foreign performers are included in the "industry" and "other domestic" performing sectors.

**SOURCE:** Organisation for Economic Co-operation and Development, unpublished tabulations.

**Figure 33. Government R&D support, by country and selected socioeconomic objective: 1997 or 1998**

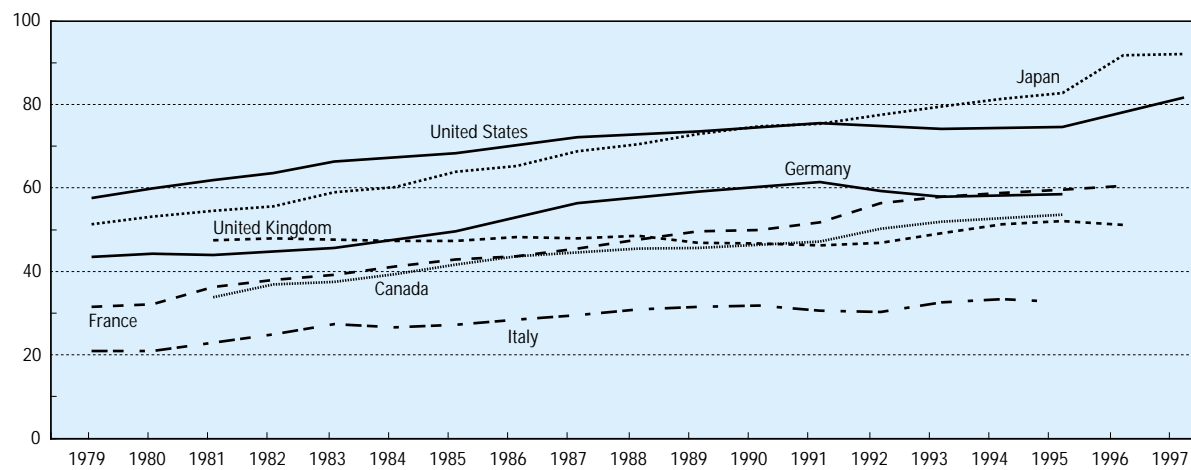


**NOTES:** Percentages may not add to 100 because of rounding. U.S. data are based on budget authority. Because of general university funds and slight differences in accounting practices, the distribution of government budgets among socioeconomic objectives may not completely reflect the actual distribution of government-funded research in particular fields. Japanese data are based on science and technology budget data, which include items other than R&D. Such items are a small proportion of the budget; therefore, the data may still be used as an approximate indicator of relative government emphasis on R&D by objective.

**SOURCES:** National Science Foundation, Division of Science Resources Studies, *Federal R&D Funding by Budget Function: Fiscal Years 1997-99* NSF 99-315 (Arlington, VA: December 1998); Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (Paris, 1999).

**Figure 34. Number of R&D scientists and engineers per 10,000 workers in the labor force, by country**

Number per 10,000



**SOURCES:** National Science Foundation, Division of Science Resources Studies, *Science & Engineering Indicators – 2000*, NSB 00-01 (Arlington, VA, 2000); and Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (Paris, 1999).

**Figure 35. Scientists and engineers engaged in R&D, by country**

(Thousands)

Year	France	Italy	Japan	United Kingdom	United States	Germany
1979	72.9	46.4	291.2	NA	614.5	116.9
1980	74.9	47.0	303.2	NA	651.1	120.7
1981	85.5	52.1	311.0	127.0	683.2	124.7
1982	90.1	56.7	321.0	128.0	711.8	NA
1983	92.7	63.0	347.4	127.0	751.6	130.8
1984	98.2	62.0	357.4	129.0	NA	NA
1985	102.3	63.8	380.3	131.0	801.9	143.6
1986	105.0	67.8	393.0	134.0	NA	NA
1987	109.4	70.6	415.6	134.0	877.8	165.6
1988	115.2	74.8	434.6	137.0	NA	NA
1989	120.4	76.1	457.5	133.0	924.2	176.4
1990	123.9	77.9	477.9	133.0	NA	NA
1991	129.8	75.2	491.1	131.0	960.4	241.9
1992	141.7	74.4	511.4	134.0	NA	234.3
1993	145.9	74.4	526.5	140.0	962.7	229.8
1994	149.2	75.7	541.0	146.0	NA	NA
1995	151.2	75.5	552.0	148.0	987.7	231.1
1996	154.8	76.4	617.3	146.0	NA	NA
1997	NA	NA	625.4	NA	1,114.1	NA

NA = not available

**NOTES:** Table includes all scientists and engineers (S&Es) engaged in R&D on a full-time equivalent (FTE) basis with the following exceptions: Japanese data include persons primarily employed in R&D in the natural sciences and engineering; and the U.S. data are a mix of S&Es engaged in R&D on an FTE basis and counts of S&Es whose primary work activity is R&D.

As a result of ongoing improvements in methodology and measurement, there are several major breaks in the continuity of the following time series: France (between 1980-81), United Kingdom (between 1984-85), and the United States (between 1983-85).

**SOURCES:** National Science Foundation, Division of Science Resources Studies, *Science & Engineering Indicators – 2000*, NSB 00-01 (Arlington, VA, 2000); and Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (Paris, 1999).

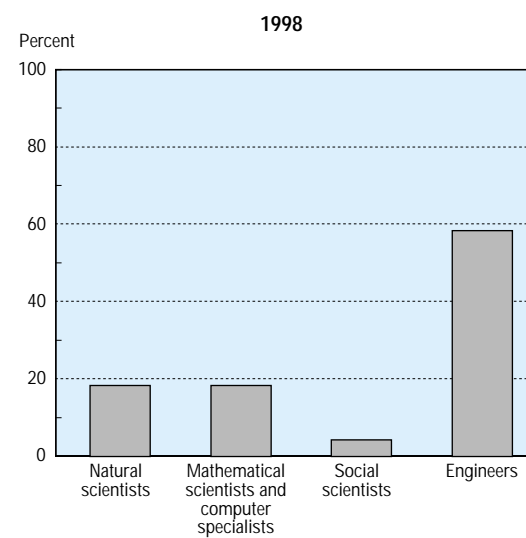


**Figure 36. INS permanent visas issued by S&E occupation**

(Thousands)

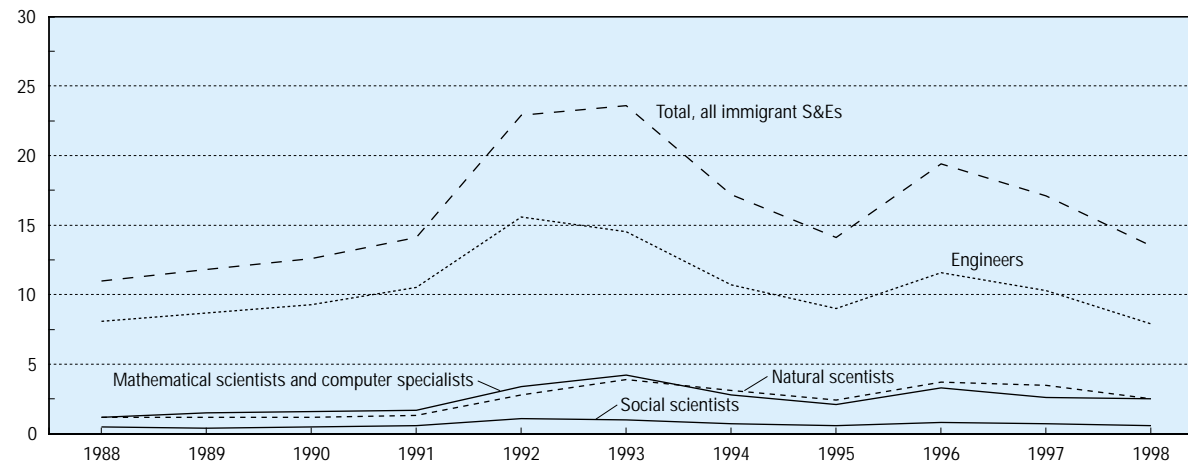
Year	Total, all immigrant S&Es	Engineers	Natural scientists	Mathematical scientists and computer specialists	Social scientists
1988	11.0	8.1	1.2	1.2	0.5
1989	11.8	8.7	1.2	1.5	0.4
1990	12.6	9.3	1.2	1.6	0.5
1991	14.1	10.5	1.3	1.7	0.6
1992	22.9	15.6	2.8	3.4	1.1
1993	23.6	14.5	3.9	4.2	1.0
1994	17.2	10.7	3.1	2.8	0.7
1995	14.1	9.0	2.4	2.1	0.6
1996	19.4	11.6	3.7	3.3	0.8
1997	17.1	10.3	3.5	2.6	0.7
1998	13.5	7.9	2.5	2.5	0.6

SOURCE: U.S. Immigration and Naturalization Service, administrative records.



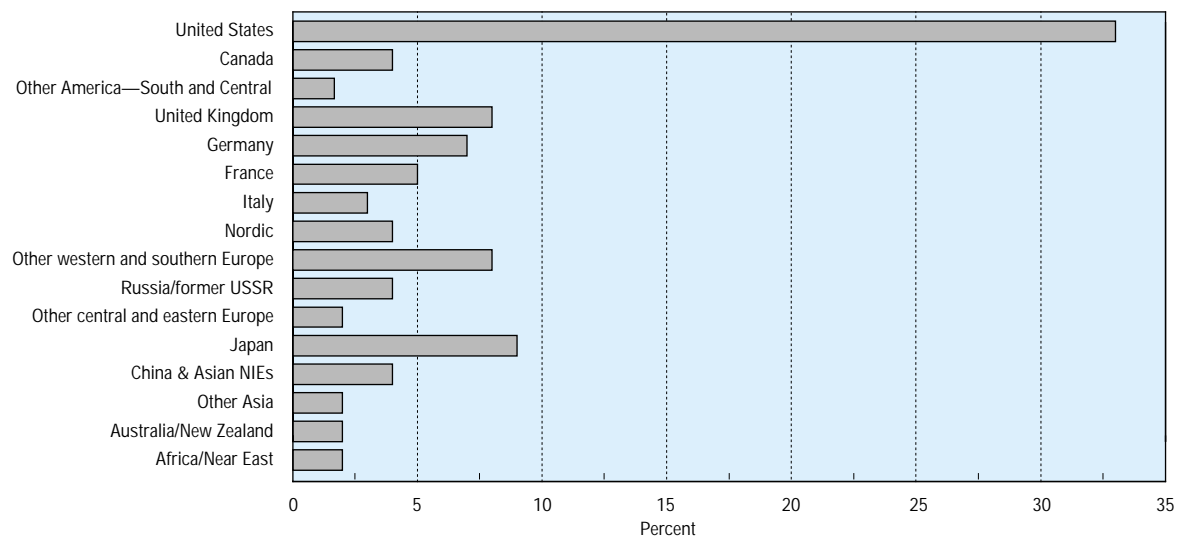
**Figure 37. Immigrant scientists and engineers admitted to the United States on permanent visas, by fiscal year of admission and S&E occupation**

Number, in thousands



SOURCE: U.S. Immigration and Naturalization Service, administrative records.

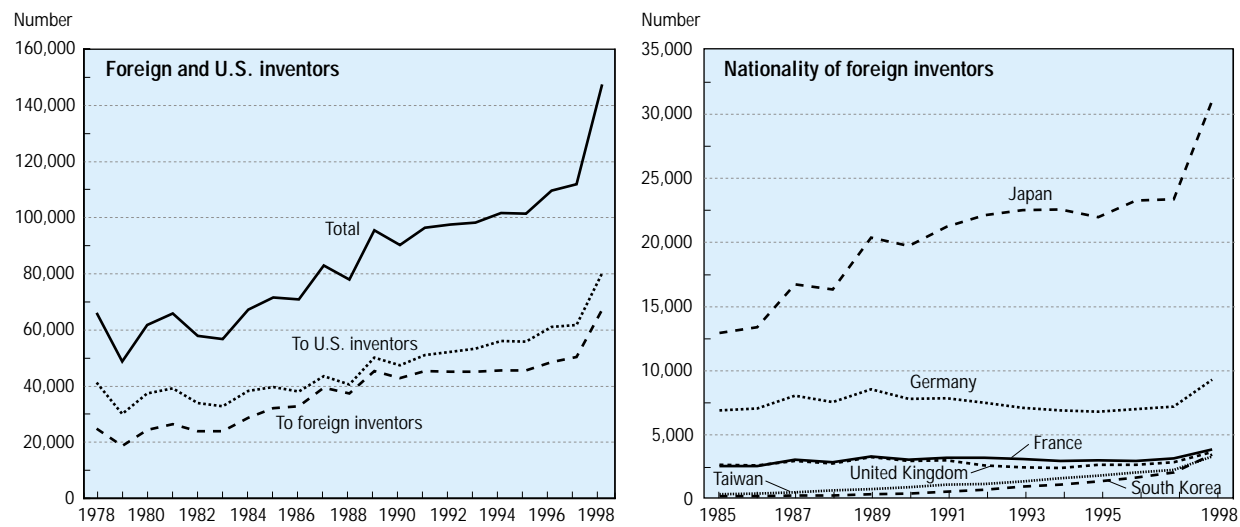
**Figure 38.** Distribution of the world's scientific and technical articles in major journals, by region/country: 1995–97



**NOTE:** NIE = newly industrialized economy. Nordic = Sweden, Norway, Denmark, Finland.

**SOURCE:** Institute for Scientific Information, Science and Social Science Citation Indexes; CHI Research, Inc.

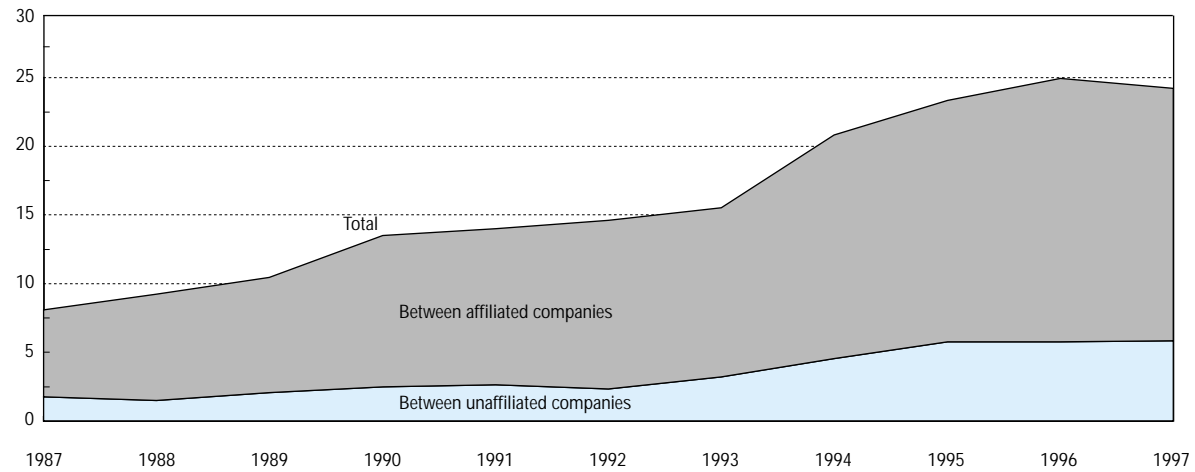
**Figure 39. U.S. patents granted, by nationality of inventor**



SOURCE: Patent and Trademark Office, *Patenting Trends in the United States, 1963-98* (Washington, DC: September 1999).

**Figure 40. U.S. trade balance in intellectual property**

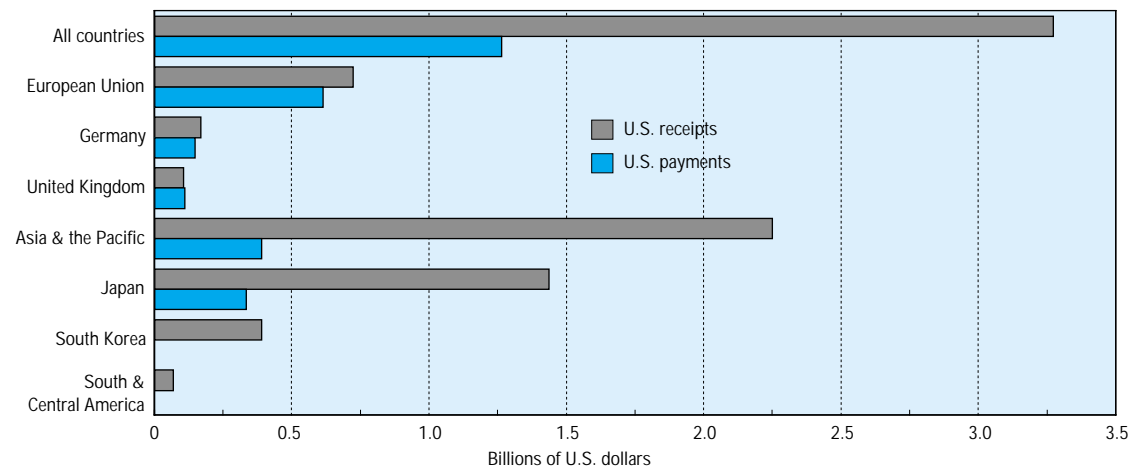
Royalties and fees in billions of U.S. dollars



**NOTE:** Reflects royalties and fees paid for intellectual property transactions among firms. Affiliated companies are foreign affiliates of U.S. firms.

**SOURCE:** U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, Vol. 78, No. 10 (October 1998).

**Figure 41. U.S. receipts and payments generated from the exchange of industrial processes between unaffiliated companies, by selected regions and countries: 1997**



**NOTE:** Payments by U.S. to South Korea, and to Central and South America are less than 1 million.

**SOURCE:** U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, Vol. 78, No. 10 (October 1998).